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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,664	03/18/2004	Min-Lung Huang	10545-US-PA	2663

31561 7590 04/04/2007  
JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE  
7 FLOOR-1, NO. 100  
ROOSEVELT ROAD, SECTION 2  
TAIPEI, 100  
TAIWAN

EXAMINER
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GRAYBILL, DAVID E

ART UNIT	PAPER NUMBER
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2822

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/04/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/708,664

Applicant(s)

HUANG ET AL.

Examiner

David E. Graybill

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6, 8-13, 15-17, 22 and 23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-13, 15-17, 22 and 23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

Claims 1-6, 8-13, 15-17, 22 and 23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The undescribed subject matter is the claims 1 and 8 language, "the wetting-barrier layer is specifically defined as nickel while the bump comprises tin material." To further clarify, in the original disclosure the wetting-barrier layer is merely specifically disclosed in preferred embodiments and examples, but not defined, as nickel while the bump comprises tin material.

In the rejections infra, generally, reference labels are recited only for the first recitation of identical claim elements.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-6, 8-13, 15-17, 22 and 23 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by Kung (20030222352).

At paragraphs 13, 25 and 26, Kung discloses the following:

An under bump metallurgy layer, between a bonding pad 16 of a chip 10 and a bump 18, for improving adhesion between the bonding pad and the bump, comprising: an adhesion layer 212, disposed on the bonding pad; a barrier layer 214, disposed on the adhesion layer; and a wetting-barrier layer 216, disposed on the barrier layer and between the barrier layer and the bump, and wherein a material of the wetting-barrier layer is specifically defined as nickel while the bump comprises tin material "if major constituents of the wettable layer 216 are copper, nickel or gold, the tin within the solder bump 18 may easily react chemically with copper, nickel" and the bump is disposed on the wetting-barrier layer and the wetting-barrier layer covers an upper surface of the barrier layer; wherein a material of the adhesion layer is selected from the following group consisting of titanium (Ti), titanium-tungsten (Ti-W) alloy, chromium (Cr), titanium nitride (TiN), tantalum nitride (TaN), tantalum (Ta), aluminum (Al) and copper (Cu); wherein a material of the adhesion layer is selected from the following group consisting of titanium, titanium-tungsten alloy, chromium, titanium nitride, tantalum nitride, tantalum and aluminum, and the bonding pad is made of aluminum; wherein a material of the adhesion layer is selected from the following group consisting of titanium, titanium-tungsten alloy, chromium, titanium nitride, tantalum nitride, tantalum and copper, and the bonding pad is made of copper; wherein a material of the barrier layer

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comprises nickel-vanadium alloy; wherein the under bump metallurgy layer further comprises an inherently anti-oxidation layer 220 and the anti-oxidation layer is disposed between the wetting-barrier layer and the bump; wherein the wetting-barrier layer is within the barrier layer (at least within the depressed portion illustrated in the Figures but not labeled) to cover the upper surface thereon.

A flip chip structure, comprising: a chip having an active surface, a passivation layer 14 and a plurality of bonding pads, wherein the bonding pads are disposed on the active surface and the passivation layer are disposed on the active surface exposing the bonding pads; an under bump metallurgy layer, wherein the under bump metallurgy layer comprising: an adhesion layer, disposed on the bonding pad; a barrier layer, disposed on the adhesion layer; and a wetting-barrier layer, disposed on the barrier layer, wherein a material of the wetting-barrier layer is specifically defined as nickel, and wherein the wetting-barrier layer covers an upper surface of the barrier layer; and a bump, disposed on the wetting barrier layer; wherein a material of the adhesion layer is selected from the following group consisting of titanium (Ti), titanium-tungsten (Ti-W) alloy, chromium (Cr), titanium nitride (TiN), tantalum nitride (TaN), tantalum (Ta), aluminum (Al) and copper (Cu); wherein a material of the adhesion layer is selected from the following group consisting of titanium, titanium-tungsten alloy,

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chromium, titanium nitride, tantalum nitride, tantalum and aluminum, and the bonding pad is made of aluminum; wherein a material of the adhesion layer is selected from the following group consisting of titanium, titanium-tungsten alloy, chromium, titanium nitride, tantalum nitride, tantalum and copper, and the bonding pad is made of copper; wherein a material of the barrier layer comprises nickel-vanadium alloy; wherein the under bump metallurgy layer further comprises an anti-oxidation layer and the anti-oxidation layer is disposed between the wetting-barrier layer and the bump; wherein a material of the bump is made of tin-silver-copper alloy; wherein a material of the bump is made of tin-copper alloy; wherein a material of the bump is tin; wherein the wetting-barrier layer is within the barrier layer to cover the upper surface thereon.

Applicant's remarks filed 1-12-7 have been fully considered and are adequately treated supra.

**For information on the status of this application applicant should check PAIR:**

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

**Alternatively, applicant may contact the File Information Unit at (703) 308-2733. Telephone status inquiries should not be directed to the examiner. See MPEP 1730VIC, MPEP 203.08 and MPEP 102.**

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Any other telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (571) 272-1930. Regular office hours:

Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is (571) 273-8300.



David E. Graybill  
Primary Examiner  
Art Unit 2822

D.G.

30-Mar-07